T by 2000:

An Accelerated Program to Reduce Soil Erosion and Sedimentation in Indiana

Final Report of the Governor's Soil Resources Study Commission

December 1985

Compare these pictures, which appeared on the cover of the Commission's interim report, with those on the cover of this final report. They illustrate the fact that Indiana's soil erosion and sedimentation problems, although serious, are quite solvable.

GOVERNOR'S SOIL RESOURCES STUDY COMMISSION

December 1, 1985

ROBERT D. ORR, GOVERNOR

The Honorable Robert D. Orr
Governor, The State of Indiana
206 State House
Indianapolis, Indiana 46204

Dear Governor Orr:

Following is the final report of the Governor's Soil Resources Study Commission. Entitled "T by 2000: An Accelerated Program to Reduce Soil Erosion and Sedimentation in Indiana," the report contains recommendations for public and private sector actions that the Commission feels are necessary to protect the State's soil resource for future generations.

Over the past two years, the Commission met formally twenty-four times; held two tours to view erosion/sedimentation problems first-hand; evaluated erosion control programs in nearby states; gathered other data and expert opinions; published its findings in an interim report entitled "Indiana's Erosion and Sedimentation Situation;" and conducted eleven public participation meetings in various areas of the State. These public meetings provided a forum for citizen reaction to the interim report and input important to the development of recommendations.

Recognizing that financial resources at all levels of government continue to be limited, the Commission nonetheless has determined that it should recommend the best possible course of action to attack the dual problems of erosion and sedimentation. And we likewise urge that as many of the resources of government as possible be turned to the task of controlling these serious yet solvable problems.

The urgency of making a start toward the goal of "T by 2000" suggests your recommendation of a legislative package to the upcoming Indiana General Assembly. The Commission urges a package consisting of necessary enabling legislation and the appropriation of $5 million for implementing Recommendations 1-3, 14 and 15, which deal with operational and funding frameworks, and for initiating portions of Recommendations 4-10, which deal with educational, technical and financial assistance.

We feel that an accelerated erosion/sediment reduction program such as proposed here not only is compatible with the State's total effort to improve citizen quality of life, but is in fact intertwined with all other aspects of that effort, including education and economic development. It is our hope that this report will serve as the framework for increased and redirected State involvement in the conservation of our essential soil resource.

Respectfully submitted,

James R. Martin

James R. Martin
Chairman

Members of the Commission

James R. Martin, Chairman
Farmer, Greensburg

James M. Ridenour, Vice Chairman
Director, Indiana Department of Natural Resources
(Alternate: William J. Andrews)

John B. Augsburger
State Senator, Syracuse

Richard J. Cockrum
Executive Director, Association of Indiana Counties
(Alternates: Diane Shea and Ellen Crump)

Wayne Dillman
Secretary-Treasurer, Indiana Farmers Union

Ralph Duckwall
State Representative, Van Buren

Robert L. Eddleman
State Conservationist, USDA Soil Conservation Service
(Alternate: Robert V. Bollman)

Howard W. Guse
Past President, Indiana Association of Soil & Water Conservation Districts, Inc.

David L. Herbst
Regional Executive, National Wildlife Federation

David A. Hoover
State Representative, Ridgeville

Roger L. Jessup
State Senator, Summitville

William F. Johnson
State Executive Director, USDA Agricultural Stabilization & Conservation Service
(Alternate: Edgar L. Whistler)

Rebecca C. Meier
Board of Directors, League of Women Voters of Indiana

John E. Mitchell
Executive Vice President of Nixon Newspapers

John M. Mutz
Lieutenant Governor, State of Indiana
(Alternate: Roger H. Stevens)

Woodrow A. Myers, Jr., M.D.
Commissioner, State Board of Health
(Alternates: David D. Lamm and Dan B. Magoun)

Marion Stackhouse
President, Indiana Farm Bureau, Inc.
(Alternate: James D. Barnett)

Donald H. Strietelmeier
Farmer, Hope

Henry A. Wadsworth, Jr.
Director, Cooperative Extension Service, Purdue University
(Alternates: Ellsworth P. Christmas and Jerry V. Mannering)

John W. Walls
President, Indiana State Chamber of Commerce
(Alternate: Lisa Kobe)

Harold H. Wilson
Chairman, State Soil & Water Conservation Committee, IDNR

William J. Andrews, Technical Secretary
Deputy Director, Indiana Department of Natural Resources

T by 2000:

An Accelerated Program to Reduce Soil Erosion and Sedimentation in Indiana

SUMMARY OF GOALS AND RECOMMENDATIONS

After an extensive examination of the problem of soil erosion and resulting sedimentation in Indiana, the Governor's Soil Resources Study Commission has concluded that a comprehensive state-supported soil erosion and sediment control program is urgently needed. The goals of such a program should be:

a. By the year 2000, erosion reduced on each acre of land to its tolerable limit (T) or below. (T value is the maximum level at which soil erosion may occur and still permit high crop productivity to be sustained economically and indefinitely.)

b. By the year 2000, all off-site sedimentation controlled by application of best practical technology.

In order to accomplish these goals, both of which are implied in the slogan "T by 2000," the Commission suggests implementation of the following recommendations:

1. That the Indiana Department of Natural Resources be given administrative responsibility for the proposed program.
2. That a Division of Soil Conservation be created by statute within IDNR's Bureau of Water and Mineral Resources as the unit specifically responsible to implement the state program, with Soil & Water Conservation Districts having authority to administer the program at the county level.
3. That the State Soil and Water Conservation Committee be renamed the State Soil Conservation Board, be increased by two members representing non-agricultural interests, and serve as the policy-making body for the Division of Soil Conservation, IDNR.
4. That professional assistance in planning, coordinating and training for adult soil conservation education activities be available to local Soil & Water Conservation Districts on a regional basis.
5. That natural resource conservation information, including soil conservation, be incorporated into appropriate areas of study in Indiana elementary and secondary schools.
6. That adequate financial support for the expansion of research activities in soil conservation be made available.
7. That each Soil & Water Conservation District be provided adequate professional soil conservation technical assistance.

8. That non-agricultural soils interpretative and erosion control expertise be available to local Soil & Water Conservation Districts on a regional basis.
9. That financial assistance be made available for the installation of erosion control structural measures on severely eroding cropland.
10. That financial assistance be made available for the conversion of highly erodible land from crop production to permanent vegetative cover.
11. That a phased, statewide regulatory program be developed and in place to be initiated after all voluntary approaches to erosion/sediment reduction have been exhausted.
12. That legislation be drawn up and enacted as soon as possible allowing prosecution of landowners who, after a reasonable period of time, fail to adopt soil conserving practices that prevent off-site sediment damage.
13. That the Division of Soil Conservation, IDNR, with all Soil & Water Conservation Districts, assist other federal, state and local entities in encouraging and monitoring compliance with those aspects of their programs, ordinances, etc. related to erosion/sediment reduction.
14. That funding be continued for the current program responsibilities of the State Soil and Water Conservation Committee (recommended to be carried out by the Division of Soil Conservation, IDNR).
15. That a dedicated fund be established for the purpose of carrying out the proposed program.

Introduction and Background

THE COMMISSION'S CHARGE

In August 1983, Governor Robert D. Orr created a special commission to assess Indiana's soil erosion/sedimentation situation and, based on its findings, to recommend actions that would help ensure continued productivity of our soil resource for the future. Specifically, the Governor's Soil Resources Study Commission was charged with:

"...conducting a comprehensive and careful examination of soil resource management problems with emphasis on soil erosion, the trends and forces shaping the use and management of agricultural lands, and the adequacy of present policy, law and management to conserve and protect the soil resource;" and

"...developing recommendations for a coordinated management policy designed to provide a framework of cooperative action by the private sector and state and local governments to protect the soil resource of Indiana."

INVESTIGATION AND FINDINGS

During its first year, the Commission extensively studied the problem of erosion and resulting sedimentation in the state. It heard testimony from experts on the erosion process and principles of control, visited areas where erosion had and had not been adequately controlled, reviewed previously compiled data on various aspects of the problem, and undertook its own investigations where relevant information was not available.

Results of the Commission's study were presented in an interim report, entitled "Indiana's Erosion and Sedimentation Situation," published November 1984.* The report first established the economic importance of the soil resource to Indiana, then documented the nature and extent of erosion occurring in the state, its immediate and long-term costs, the benefits to be realized from control, and finally the status of Indiana's control efforts, including the roles of organizations and agencies involved in those efforts.

Here in brief are the major reported findings of the Commission:

- Soil is the resource base for a $4 billion industry that infuses $12-15 billion annually into the state's economy.
- Yet each year more than 100 million tons of that resource are being eroded through the action of wind and water.
- Over 40 percent of Indiana's cropland is eroding at a rate that will, if unchecked, reduce its productivity.

---

* Copies are available for review at county Cooperative Extension Service and USDA Soil Conservation Service offices, or may be ordered from the State Soil and Water Conservation Committee, AGAD Building, Purdue University, West Lafayette, IN 47907.

- The value of lost topsoil and the plant nutrients carried away with it has been estimated to exceed $450 million a year.
- Net income to farmers is being reduced by well over $100 million because of lower yields and higher production costs resulting from erosion.
- County governments spend over $7 million a year to remove sediment from road surfaces and roadside ditches; however, total roadway sediment cleanup would cost an estimated $256 million and about $15 million annually thereafter for adequate maintenance.
- Damage from erosion in urban areas totals more than $7 million a year, not including what is spent to remove sediment from drinking water supplies which approaches $1 million in four of Indiana's major metropolitan areas.
- The long-term "costs" of erosion to the state include continued (and in some cases irreversible) soil productivity loss, reduced real property values, impaired use of water resources and deteriorated water quality.
- Effective erosion/sediment control, on the other hand, would mean an out-of-pocket savings of millions of dollars annually for Indiana citizens as landusers and/or taxpayers, would ensure the viability and permit expansion of our soil-based industries, and would preserve the utility of our water resources.
- Despite the problems that still exist, Indiana has nevertheless made significant strides in combatting erosion over the past 50 years; today, for example, the soil is considered adequately protected on 59 percent of our 13.8 million cropland acres and on 90 percent of our 6.7 million acres of pasture, forest and other rural lands.
- A key to Indiana's erosion control successes to date has been the degree of involvement, cooperation and expertise of various public agencies and private organizations, anchored at the local level by active Soil & Water Conservation Districts.

In essence, the Commission's study confirmed that the costs associated with soil erosion in Indiana were indeed large, as were the benefits associated with its control; and that, although progress has been made over the years in reducing the state's erosion/sedimentation problem, the task remaining is formidable.

GOALS FOR EROSION/SEDIMENT REDUCTION

In early 1985, eleven public meetings were held throughout the state both to gather citizen reaction to the interim (situation) report and to seek input that might prove valuable in the development of recommendations. As a result of those meetings and additional expert testimony, the Commission adopted the following erosion and sediment reduction goals for Indiana that define the progress yet needed and establish a time frame for making that progress:

Goal 1. *By the year 2000, erosion reduced on each acre of land to its tolerable limit (T) or below. (T value is the maximum level at which soil erosion may occur and still permit high crop productivity to be sustained economically and indefinitely.)*

Goal 2. *By the year 2000, all off-site sedimentation controlled by application of best practical technology.*

The slogan "T by 2000" is used here to denote the equal and concurrent accomplishment of these two goals.

The disturbingly high annual erosion losses on over 6 million acres of agricultural land, the resulting decreases in productivity, and the threats to water quality from sedimentation justify, in the Commission's opinion, immediate attention to the above goals. However, for Indiana to achieve "T by 2000" assumes that both goals are quickly adopted, accorded high priority and aggressively addressed. It also assumes that land within tolerable soil loss limits is maintained at T or below and does not return to high erosion levels.

Even when the goals have been met, some erosion will still take place; streams will continue to transport and lakes continue to receive certain amounts of sediment as natural hydrologic systems. However, no land should be losing soil at a rate greater than its ability to replenish it.

CITIZEN/GOVERNMENT RESPONSIBILITIES IN SOIL RESOURCE PROTECTION

In "developing recommendations for a coordinated management policy...to protect the soil resource of Indiana," the Commission recognizes that the erosion/sedimentation problem affects quality of life and economic potential not just for the individual whose livelihood is tied to the land, but also for the general citizenry of Indiana, and not just in the present, but also for future generations. Therefore, underlying the Commission's recommendations are the following assumptions concerning soil conservation and the attendant responsibilities of individual landusers, of all citizens and of government:

a. Because soil is a basic and essential resource of the state, its conservation is fundamental to the present and future health, welfare and economy of the people of Indiana.

b. Impairment or destruction of soil productivity through water and wind erosion, and damage to the land and to water quality from consequent sedimentation are severely adverse to the public interest.

c. All landowners or users, both public and private, have a basic obligation to so protect their land that the rate of soil erosion thereon does not exceed the rate of natural soil replenishment.

d. By reason of the inherent public interest, it is appropriate that public funds be used to assist landowners in fulfilling the above obligation, particularly where adequate protection necessitates high-investment and/or low-return corrective measures.

e. Involvement of state and local government in erosion/sediment control efforts is likewise appropriate and necessary. Such involvement is seen to include: (1) development and direction of educational efforts to instill a public conservation ethic as well as increase citizen awareness, knowledge and support; (2) provision of technical and financial assistance to bring the rate of soil loss on all lands to within tolerable limits or T; and (3) exercise of regulatory authority, as warranted, to ensure continued soil conservation and provide recourse for off-site sediment damage resulting from land abuse or misuse.

f. There exists at the county level an established, visible, accepted administrative structure in the form of 92 Soil & Water Conservation Districts (SWCDs) capable of delivering to landusers the additional services that an intensified soil conservation program would provide.

FRAMEWORK FOR ACTION

The Commission's interim report separated the lands of Indiana into three categories relative to degree of sheet, rill and wind erosion occurring on them—those eroding at a level less than the tolerable limit (T), those eroding between T and twice T (2T), and those eroding above 2T. It also identified, as another category, those sites that are apt to be significant sources of sedimentation, such as a streambank, established gully, unprotected roadside or construction site.

The type and amount of remedial action needed in each category will differ, suggesting that Indiana's erosion/sediment situation can be dealt with in segments and that the actions recommended here can be targeted. For instance,

- Where land erodes less than T, the need is primarily for educational programs to insure that the erosion level on these acres does not again exceed T but rather continues to decline.
- Where land erodes between T and 2T, educational programs plus technical assistance are needed to encourage and advise the landowners as they use their own financial resources for soil management practices, like conservation tillage, that will bring erosion rates at least down to T.
- Where land erodes above 2T or sites are identified as significant sediment sources, the appropriate soil protection practices are likely to involve installation of erosion control structures or conversion to vegetative cover, both of which provide little or no short-term economic return. Therefore, not only are educational programs and technical assistance needed, but also financial help on a cost-share basis.

Recommendations for Achieving Erosion/Sediment Reduction

With the above assumptions and procedural framework in mind, the Commission recommends that actions be taken in five general areas—operational structure, education and research, technical assistance, financial assistance and regulation—to accomplish the adopted goals by the year 2000.

OPERATIONAL STRUCTURE

Clearly, erosion and sedimentation pose a serious threat to Indiana's soil base, its economy and the public welfare. Thus, it is important that state government assume a visible and active leadership role in any major effort to address the problem. In so doing, the state is publicly affirming that soil as a basic resource deserves immediate protection and management. Such visible commitment is critical to active public support and participation.

The Commission feels that responsibility for carrying out the accelerated erosion/sediment reduction program being proposed here logically rests with some major existing unit of state government. Program direction by that governmental unit, appropriately structured, would (a) permit an organized, professional and targeted approach to problem solving, (b) provide the administrative and supervisory control necessary to implement policies and coordinate activities, and (c) ensure the long-term maintenance of erosion/sediment reduction goals once those goals have been met.

The following recommendations are the Commission judgments as to the appropriate governmental unit and the operational structure most conducive to effectively directing Indiana's soil resource protection program:

Recommendation 1. *The Indiana Department of Natural Resources should be given administrative responsibility for the program.*

The IDNR seems the logical agency for numerous reasons, among them: (a) as the name implies, it is already involved in various matters related to soil; (b) it follows an inter-disciplinary approach to resource management, which recognizes soil as a vital part of the natural resource community thus encouraging development of a true "land ethic;" and (c) it is experienced in regulatory and legal matters, which may be a necessary aspect of this program.

Recommendation 2. *A Division of Soil Conservation should be created by statute within IDNR's Bureau of Water and Mineral Resources as the unit specifically responsible to implement the state program, with the Soil & Water Conservation Districts having authority to administer the program at the county level.*

Division staff would include SWCD-based soil conservation technicians, regional non-agricultural soils and erosion control specialists, and appropriate administrative and clerical personnel. In addition to implementing the new program, this staff would carry out the other on-going responsibilities of the State Soil Conservation Board.

Recommendation 3. *The State Soil and Water Conservation Committee should be renamed the State Soil Conservation Board, be increased by two members representing non-agricultural interests, and serve as the policy-making body for the Division of Soil Conservation.*

EDUCATION AND RESEARCH

Education is considered a key to not only achieving "T by 2000," but also maintaining it in the years beyond. In the short term, the awareness, desire and motivation among Indiana landusers to control erosion must be increased significantly if the task is to be completed on time. In the longer run, there must be heightened general public understanding and appreciation of the soil resource and its protection if the gains made are to be sustained.

Over the years, soil conservation education has been done primarily through the local Soil & Water Conservation District, Soil Conservation Service and Cooperative Extension Service. Many times, the activities are carried out by lay and technical people who are not educational specialists. Thus, the efforts often suffer from lack of timeliness, coordination, sufficient inputs and attention because those involved have other primary responsibilities.

For the proposed thrust to succeed, there is immediate need to aggresively, repeatedly and convincingly tell the story of erosion and the dollar value of soil conservation, not only to local landusers but to the general public as well. It is also felt that, if the next generation has a proper understanding and sense of stewardship toward the soil, the public resources needed to correct erosion/sedimentation problems in the future would be significantly reduced. An effective formal conservation education program that instills a "conservation ethic" in future generations will more than pay for itself.

The foundation of any conservation education program is the new information generated by research. Innovative methods of erosion control and sediment reduction must continually be developed and evaluated to keep pace with changing economic conditions and technological advancements. Ensuring an active, on-going research base in soil conservation is vital to the educational efforts proposed here.

The Commission makes the following recommendations relative to educational and research needs:

Recommendation 4. *Professional assistance in planning, coordinating and training for adult soil conservation education activities should be available to local Soil & Water Conservation Districts on a regional basis.*

This assistance would be provided by 10 soil conservation education specialists located strategically throughout the state, plus a state coordinator. This educational function can best be carried out by the Cooperative Extension Service, Purdue University, but must be coordinated with all other aspects of the erosion/sediment reduction program by the State Soil Conservation Board, which has ultimate responsibility for the total program.

These soil conservation education specialists would work with local SWCDs in identifying and implementing needed educational activities, such as conservation tours and demonstrations, outdoor conservation laboratories, teacher workshops, contests, exhibits, informational campaigns and mass media use. They would also assist in developing, coordinating and launching specific educational efforts as well as provide training for carrying out on-going programs directed toward landusers.

Estimated annual funding need of this recommendation is:

Soil Conservation Education Specialists (10)	
• Salaries and related costs	$318,922
• Support costs (includes vehicle operation and maintenance, telephone, postage, supplies, secretarial assistance, mileage, per diem, lodging)	88,410
TOTAL	$407,332

Soil Conservation Education Specialist Coordinator (1)	
• Salary and related costs	$37,668
• Support costs (includes telephone, postage, supplies, secretarial assistance, mileage, per diem, lodging)	12,700
TOTAL	$50,368

Recommendation 5. *Natural resource conservation information, including soil conservation, should be incorporated into appropriate areas of study in Indiana elementary and secondary schools.*

This could be accomplished in the following ways:

- By reviewing textbooks to ascertain if references to soil conservation exist, are correct and are appropriate to Indiana's situation. If additions or changes are in order, then formal recommendations can be made to the Commission on Textbook Adoption. Textbook review and recommendations might be made jointly by the Division of Soil Conservation, IDNR, and the Cooperative Extension Service.
- By assembling appropriate previously prepared educational materials regarding the soil resource in Indiana and distributing it to schools. This could be done by the soil conservation education specialists.
- By producing new educational resources (including printed and audio-visual materials, computer programs, etc.) about soil conservation for use by schools, perhaps on a loan or rental basis. Material might be developed by the Cooperative Extension Service and distributed through commercial sources.
- By making the soil conservation education specialists available to schools to conduct special programs throughout the year and to serve as a conservation information resource for teachers.
- By incorporating soil conservation information into certified teacher education and continuing education curricula for Indiana. At least 10 hours of classroom time in a required science course for teachers should be devoted to the fundamental principles and activities of soil conservation in Indiana. The Soil Conservation Service district conservationists could teach this information at the state's teacher education institutions.
- By the State Department of Education requiring the teaching of specific soil conservation units in elementary and secondary grade levels.

Recommendation 6. *Adequate financial support for the expansion of research activities in soil conservation should be made available.*

Among the priority topics needing support for research are: (a) mechanics of soil erosion, (b) alternative erosion control techniques, (c) effects of erosion on soil productivity, (d) effects of sedimentation, (e) economics of erosion damage, sedimentation and various control methods, and (f) equipment adaptations for conservation tillage systems.

TECHNICAL ASSISTANCE

Greater ability to identify, prioritize and develop plans to solve the problems occurring on severely eroding *agricultural* land in each county of the state is a prime order of business for accomplishing "T by 2000." The opportunity to do more on-site evaluations and to work with landusers individually to explain and encourage adoption of appropriate soil conservation practices would result in significant erosion and sedi-

ment reduction in a rather short time. Presently, however, federal, state and local soil conservation-related agencies have insufficient funding and personnel to provide the on-site investigations and personal contacts so badly needed in high erosion areas.

There is also critical need to identify, prioritize and develop plans to solve the severe erosion/sedimentation problems on certain *non-agricultural* lands. These problems often require special conservation expertise based on the collection and interpretation of detailed soils information. Again, existing soil conservation agencies simply do not have adequate staff or funds to assist non-agricultural landusers and appropriate agencies, such as the State Board of Health, local health departments and county or area plan commissions, to deal with these problems within a desirable time frame.

The Commission recommends the following concerning technical assistance:

Recommendation 7. *Each Soil & Water Conservation District should be provided adequate professional soil conservation technical assistance.*

This means at least 75 technicians assigned to the SWCDs where particularly severe erosion problems exist. Their tasks would include: identifying high erosion lands, determining ownership of those lands, making personal contact with the landowners, and assisting them to develop plans for and apply the appropriate soil conservation practices.

It is anticipated that these technicians would be selected from the local workforce, trained on-the-job and housed in Soil Conservation Service or perhaps Cooperative Extension Service offices. Funding of the positions would come from the state and be administered cooperatively by the Division of Soil Conservation, IDNR, and the SWCDs. Although under authority of the State Soil Conservation Board, they would be responsible to SWCDs as assigned. This places them in a position to respond directly to local needs and demands, to understand the conditions causing erosion locally, and to know what programs would be best suited for and accepted by the county.

A state coordinator located in the Division of Soil Conservation, IDNR, would provide the management and supervision for this technical assistance service.

Estimated annual funding need of this recommendation is:

Soil Conservation Technicians (75)	
• Salaries and related costs	$1,478,469
• Support costs (includes vehicle operation and maintenance)	135,150
TOTAL	$1,613,619
(Vehicle purchase, $636,000)	
Soil Conservation Technician Coordinator (1)	
• Salary and related costs	$37,668
• Support costs (includes telephone, postage, supplies, secretarial assistance, mileage, per diem, lodging)	12,700
TOTAL	$50,368

Recommendation 8. *Non-agricultural soils interpretative and erosion control expertise should be available to local Soil & Water Conservation Districts on a regional basis.*

This expertise would be provided by 10 soils and erosion control specialists regionally located in Soil Conservation Service offices to serve multi-county areas, plus a state coordinator located in the Division of Soil Conservation, IDNR. Their job would be to interpret soil surveys, conduct on-site investigations of non-agricultural erosion/sedimentation problems, perform detailed site evaluations, assist in developing solutions, and convey the information to specific clientele.

Funding for these positions would come from the state and be administered cooperatively by the Division of Soil Conservation, IDNR, and assigned SWCDs. All

would be under the authority of the State Soil Conservation Board but responsible to SWCDs as assigned.

To equip these specialists with the latest information and technology on an on-going basis, the state would provide Purdue University an annual grant for program development, research and continuing education in non-agricultural soils interpretation and erosion control. Among its responsibilities in this area, the University would develop procedures for carrying out on-site investigations, conduct research on soil properties and erosion/sedimentation problems, update soil surveys, and prepare publications and data bases for public use.

Estimated annual funding need of this recommendation is:

Soils and Erosion Control Specialists (10)	
• Salaries and related costs	$318,922
• Support costs (includes vehicle operation and maintenance)	67,210
TOTAL	$386,132
(Vehicle purchase, $84,800)	
Soils and Erosion Control Specialist Coordinator (1)	
• Salary and related costs	$37,668
• Support costs (includes telephone, postage, supplies, secretarial assistance, mileage, per diem, lodging)	$12,700
TOTAL	$50,368
Soils Interpretation and Erosion Control Grant	
• To Purdue University for program development, research and continuing education in soils interpretation and urban erosion problems	$79,500

FINANCIAL ASSISTANCE

Financial assistance to landowners for the application of high-investment and/or low-return erosion control measures on severely eroding land is vital to realizing "T by 2000." This assistance must be used with a sense of urgency in dealing with the highest eroding as well as the most erodible croplands.

The SCS National Resources Inventory has identified nearly 5.7 million Indiana cropland acres as eroding at a rate exceeding the tolerable limit (T). Of that total, erosion on about 3.2 million acres can be successfully reduced to T by applying soil conservation measures (particularly conservation tillage) that either require relatively little investment or produce a reasonable rate of return.

The other 2.5 million acres, however, have erosion rates or soil and topographic characteristics such as to require corrective measures that would be costly or provide little short-term payback. It is for these acreages that landholders need assistance.

The Commission makes the following recommendations concerning financial incentives:

Recommendation 9. *Financial assistance should be made available for the installation of erosion control structural measures on severely eroding cropland.*

An Erosion Control Structure Financial Assistance Program would be initiated and applicable only to (a) Land Capability Class I, II, III and IV* cropland acres that are

* See Appendix A for definitions of land capability classes.

eroding at a rate exceeding twice the tolerable limit (i.e., above 2T), and (b) those specific sites identified as contributing significantly to the sedimentation of public waters. This program would provide funds on a cost-share basis for installing structural measures, such as grassed waterways, water and sediment control basins, terraces and overfall structures, which will reduce severe erosion but have a large initial cost and rather small (if any) return to the landowner.

The State Soil Conservation Board would promulgate rules to administer the program, including establishing criteria for participation, levels of cost-sharing and priorities for implementation. The SWCDs would be responsible for administration of this program at the local level.

Indiana cropland acreage in Land Capability Classes I, II, III and IV eroding above 2T is estimated to be: Class I, 18,000; Class II, 1,251,000; Class III, 556,000; and Class IV, 524,000. Assuming similar required structural treatments (and costs) for Class I and II land and for Class III and IV land, the estimated total and annual funding needs of this recommendation are:

Cropland acres eroding above 2T	Approximate structural cost	Total need all sources	Average annual need all sources
Class I, II --1,269,000	$150/acre	$190,350,000	$12,690,000
Class III, IV--1,080,000	$300/acre	324,000,000	21,600,000
		$514,350,000	$34,290,000

Average annual need from all sources	=	$34,290,000
Landowner portion of 50% cost-sharing	=	-17,145,000
Public portion of 50% cost-sharing	=	$17,145,000
Estimated average annual federal ACP funds available for lands over 2T	=	-2,250,000
Estimated average annual state funds needed for lands over 2T	=	$14,895,000

Recommendation 10. *Financial assistance should be made available for the conversion of highly erodible land from crop production to permanent vegetative cover.*

A Land Use Conversion Financial Assistance Program would be initiated and applicable only to (a) Land Capability Class VI and VII cropland acres that are eroding at a rate exceeding the tolerable limit (i.e., above T), and (b) such sites that are significant sources of sediment affecting public waters. This program would provide up to the full cost of machine hire, materials and labor for the establishment of vegetative cover, either trees or grass.

Again, the State Soil Conservation Board would administer the program and set the eligibility, funding level and priority criteria under promulgated rules. SWCDs would be responsible for administration of this program at the local level. One stipulation of the program would be restriction against converting land back to crop production unless such conversion was approved by the local SWCD and would be done in accordance with a conservation plan for that land.

Indiana cropland acreage in Land Capability Classes VI and VII eroding above T is estimated to be: Class VI, 140,000; and Class VII, 8,000. Assuming 15 percent of these 148,000 acres converted to tree cover and 85 percent to grass cover, the estimated total and annual funding needs of this recommendation are:

Cropland acres converted	Approximate conversion cost	Total needs	Annual average needs
Trees-- 22,200	$216/acre	$4,795,200	$319,680
Grass--125,800	$92/acre	11,573,600	771,573
		$16,368,800	$1,091,253

REGULATIONS

To achieve the dual goals of erosion reduced to T on all land and adequate control of off-site sedimentation damage by the year 2000, the Commission recognizes that some type of uniform statewide regulatory program will undoubtedly be necessary. However, its unanimous sentiment—and that expressed in public meeting—is to utilize regulations for achieving compliance *only* if all reasonable efforts at educational, technical and financial assistance fail to reach the goals. Enforcement of regulations would require time and resources that can be better invested in education and assistance in the early years of an accelerated erosion/sediment reduction program.

The sole focus of any regulatory program is toward attainment of the stated goals. Thus, at no time should regulations dictate a specific practice or means to achieve a desired level of erosion control. And, enforcement of any punitive measures would take place only after a reasonable period of time during which every effort was made to ensure full opportunity for voluntary adoption of soil conservation measures. Regulation then becomes the means to reach those who fail to voluntarily control erosion.

The Commission makes the following recommendations relative to regulations:

Recommendation 11. *A phased, statewide regulatory program should be developed and in place to be initiated after all voluntary approaches to erosion/sediment reduction have been exhausted.*

This allows early concentration of financial resources on educational and incentive efforts, yet serves notice to landowners and users that regulations will be imposed if voluntary approaches fail.

Recommendation 12. *Legislation should be drawn up and enacted as soon as possible allowing prosecution of landowners who, after a reasonable period of time, fail to adopt soil conserving practices that prevent off-site sediment damage.*

It is important that such legislation clearly spell out what does and does not constitute violation, the rights and responsibilities of an alleged violator, and those of the enforcing agencies. The following are seen as key elements of such legislation:

- Sediment damage must occur off-site to affected property for the owner of the sediment-producing land to be in violation.
- However, any owner who is either following an approved conservation plan or managing his land such that average erosion rates (as calculated by the Universal Soil Loss Equation) are within tolerable limits cannot be considered in violation.
- SWCDs would be responsible for carrying out the sediment-reduction compliance procedures at the local level. If local level efforts fail to gain compliance, a given case may be elevated to the State Soil Conservation Board.

Addressing the regulatory aspects of Indiana's soil resource protection efforts immediately through legislation allows the compliance mechanisms to be implemented in stages over time but still be fully in effect within ten years.

Recommendation 13. *The Division of Soil Conservation, IDNR, with all Soil & Water Conservation Districts should assist other federal, state and local entities in encouraging and monitoring compliance with those aspects of their programs, ordinances, etc. related to erosion/sediment reduction.*

For example,

- Assistance to *federal* soil conservation and sediment reduction efforts might include: (a) encouraging farmer participation in a conservation reserve program, (b) helping identify the fragile lands that should not be permitted to participate in federal farm programs if cropped, and (c) ensuring that ground cover has been planted on set-aside lands.

- Assistance to *state* soil conservation and sediment reduction efforts could include: (a) working with public land holding agencies in state government to set a good example in establishing and implementing soil conservation resource management plans for all state-controlled lands; and (b) involvement of SWCDs in IDNR's permit program for land-disturbing activities. Notification of permits issued could be sent to local districts, which would do follow-up inspection and report any violation of the erosion control portion of the permit.
- Assistance to *local* soil conservation and sediment reduction efforts might involve: (a) developing for local communities model ordinances that deal with urban erosion and (b) working with county officials to enact and enforce ordinances that protect roadways, drainage ditches and other public lands. Among that which could be regulated by ordinance, local government has the authority to: recover costs for road drainage ditch clean-out where excessive erosion due to improper land management was the cause and the violator identified; require erosion control plans as part of improvement location permits issued by plan commissions; and require sod buffer strips to be left along road and drainage rights-of-way.

Funding Considerations

Estimated average annual funding needs of the 15-year accelerated erosion/sediment reduction program for Indiana being proposed here are as follows:

• Educational component	$457,700
• Technical assistance component (Vehicle purchase, $720,800)	2,179,987
• Financial assistance component	15,986,253
TOTAL	$18,623,940

The Commission makes the following recommendations relative to funding needs:

Recommendation 14. *Funding should be continued for the current program responsibilities of the State Soil and Water Conservation Committee (recommended to be carried out by the Division of Soil Conservation, IDNR).*

Funding for the state's present soil conservation programs or for the recommended operational structure changes has not been included in the Commission's estimates for the proposed program.

Recommendation 15. *A dedicated fund should be established for the purpose of carrying out the proposed program.*

This fund would be administered by the Division of Soil Conservation, IDNR, and accountable to the State Soil Conservation Board as the Division's policy-making body. Financing the program through a dedicated fund would insure its continuity, which is necessary to accomplish "T by 2000."

Of the many potential sources for these dedicated monies, the Commission has identified three to illustrate how the estimated average annual funding needs might be met: (a) committing 0.066% of the existing sales tax, or (b) establishing a 0.6% sales tax on food, or (c) increasing the tax on cigarettes by 2.5 cents.

Appendix A

DEFINITIONS OF LAND CAPABILITY CLASSES (emphasizing soil erosion hazard and its correction)

Class I. Very good, productive land that can be safely cultivated with ordinary farming methods. It is nearly level, deep, well drained, easily worked and suitable for intensive cultivation. Soils have little or no damage from erosion during the cropping season or any other permanent limitation. They will grow all crops suited to the climate.

Class II. Good land but has some limitations that make it more difficult to row crop than Class I land. Soils may be limited by the effects of: gentle slopes (2-6%), moderate susceptibility to erosion, or moderately adverse effects of past erosion.

Class III. Land moderately good for cultivation. It can be farmed regularly, but its use is more limited than Class II land. Soils may have one of the following limitations: moderately sloping (6-12%), highly susceptible to erosion, and severely affected by past erosion.

Class IV. Has very severe erosion hazards that restrict its use for cultivated crops and requires careful management. Its use for cultivated crops is limited by the effects of one or more of the following: strong slope (12-18%), susceptibility to erosion, severe past erosion, and very shallow soils with limited root zone. Soils are suited to occasional but not regular cultivation.

Class VI. Has severe limitations that make it generally unsuited for cultivation and limit its use largely to pasture, woodland or to wildlife food or cover. Soils have natural features that cannot be corrected for row crops such as: steep slopes, severe erosion hazard, very thin or no surface soil because of severe past erosion, very shallow rooting zone and stoniness; these may occur singly or in combination. Row-cropped Class VI land eroding above T should be converted to permanent cover.

Class VII. Has very severe limitations that make it unsuited for cultivation and restrict its use to woodland, wildlife or permanent pasture. The soils have natural features similar to those in Class VI, but the restrictions are more severe. Examples are: very steep uneroded soils, sloping to steep gullied soils, steep shallow and stony soils, and sloping coarse textured soils. All Class VII row cropped land should be converted to permanent cover.